

PSYCHE.

REVISION OF THE SPECIES OF SPHARAGEMON.

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Since the publication of my paper on the New England species of this genus (Proc. Boston soc. nat. hist., xxvi, 220-240) I have had an opportunity to study all the material in this genus in the collections of Mr. Scudder and the National Museum. In addition, I have received several forms which would otherwise not have been seen, together with numerous notes on the distribution of the species, from Prof. Lawrence Bruner. I desire to express here my thanks to Mr. Scudder, Prof. Bruner, and Dr. Riley for the obligations under which they have thus placed me. While I have been unable, owing to lack of sufficient material, to reach as definite conclusions as I had in some cases hoped, it seems best to publish the results of this inspection of a considerable number of specimens from all parts of the country.

All of the material examined is from localities east of the Sierra Nevada Mts., yet it is not unlikely that the genus may occur on the Pacific coast. A single specimen of one species from Mexico, and several of another from Aspinwall (if the labeling is correct, which is open to some doubt in the latter case), indicate a considerable southward extension of the genus.

While some species are restricted to a limited portion of the territory mentioned, as nearly as may be judged, others occur over its entire area.

The more important papers treating of the members of this genus are those of Scudder (Proc. Boston soc. nat. hist., xvii, 467-471); Morse (*ibid.*, xxvi, 220-240); Saussure (Prodromus Oedipodiorum, 134-140); and the original descriptions of Say, Thomas, and Scudder, references to which will be found in the proper places elsewhere in this paper. In the bibliography and synonymy references are given only to the more important items.

I regret to say that several changes have been found necessary in the nomenclature of the species. At the time of preparing my previous paper it seemed best to accept the determinations of Scudder, at least until the western forms could be more thoroughly examined. This I have now done, as far as material permitted, and while some points remain unsettled a considerable advance has been made — there is strong reason for believing that the names as used here have been accurately applied and now rest upon a permanent basis. Discrimination of the species has proved a stumbling-

block to many; why this is so is not to be wondered at in some cases, though in others it is difficult to understand. Species belonging to different sections of the genus and even to other genera have been confused by the ablest authorities. Examples will be readily found in the synonymy given under the different species, statements there made referring only to specimens bearing labels on the pins, not to those arranged with them, since mistakes are liable to occur during re-arrangement.

Variation in color in this genus, in common with other Oedipodinae, counts for very little; the same species or race may be of all shades from a general dark fuscous to a pale buff or even a bright reddish brown, even in specimens from the same spot, yet it is probable that the general tint of a large series will be found to agree with the color of the soil of the locality, or other peculiarity of environment. Specimens of several different species from certain localities in Colorado show a striking reddish, almost rosaceous, coloration, due to some such cause. The coloration so frequently found in *collare*, viz., the ventral half of head, sides and metazona of pronotum white or pale clay color, is not characteristic of that species nor confined to it, specimens lacking that coloration being about equally common, and other species showing it. It is found in several species but most commonly in those of the *collare* series,

especially from the western States. It is doubtful if it occurs in the *bolli* series, whose coloration is different in character from that of the others.

Variation in size of individuals of the same species is quite noteworthy, the average size of species increasing to the southward. In general, it may be stated that Texan specimens are twenty-five to forty per cent. larger than those from the northern borders of the country. This is well shown in *bolli*, by comparing New England and Texas specimens, linear measurements of the latter showing about forty per cent. increase. The sexes also differ markedly in this respect; an extreme case of which is shown in two specimens of *collare* from northern Indiana in Mr. Scudder's collection; in these the female is fifty per cent. larger in linear measurements than the male, the two forming the extremes in the table of measurements given under that species.

The diagnostic characters of most importance are the structure and elevation of the pronotal carina; of less value are the size and prominence of the eyes, color and marking of hind legs, form of hind margin of pronotum, and extent of fuscous wing-band.

The species may be arranged in three series according to the structure of the pronotum. In the first of these, which is readily distinguished from the other two, and of which *bolli* may be taken as a type, the disk of the pronotum is flat in longitudinal section and the carina is equally compressed throughout;

the body is also more compressed and the hind tibiae are usually heavily infuscated. This section is worthy of sub-generic distinction. In the others the disk of the prozona is more or less elevated on its posterior portion, rising broadly upon the carina, rendering it less compressed in that part; the lateral carinae are usually more distinct; the body is less compressed, and the hind tibiae red, sometimes annulate with pale next base. The species showing this structure are referable to a "high" and a "low" series, though they are closely related and it is probable that connecting forms will be found. In the "high" forms (*collare* series) the carina is well or highly developed, much compressed, and the hind margin of the pronotum shows a tendency to be strongly acute-angled with excavated

sides. In the "low" forms (*aequale* series) the carina is low or carinate and the hind margin is more nearly or quite rectangular with straight sides. This series is represented in New England by *saxatile*. The form described here as *humile* has the carina so little developed as to leave some doubt regarding its proper position in the *bolli* or the *aequale* series.

Whether the genus should be extended to include additional species remains to be learned by study of the forms most closely allied; whether it is an entirely natural group as it stands is perhaps a little questionable. As here treated it follows closely the characterization given by Scudder when established; and by Saussure, who places it as a subgenus under *Dissosteira* (Prod. Oed., 134-135).

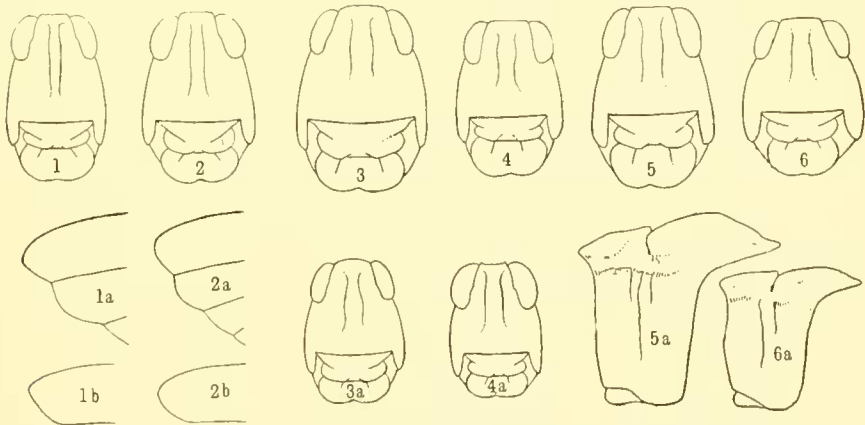


Fig. 1, 1a, 1b, *S. crepitans*, ♀. Fig. 2, 2a, 2b, *S. bolli*, ♀
 ♂ Fig. 5, 5a, *S. cristatum*, ♀ Fig. 6, 6a, *S. collare*, ♀.
 Fig. 3, *S. aequale*, ♀; 3a, ♂ Fig. 4, *S. saxatile*, ♀; 4a, ♂

GROUP 1. BOLLI SERIES.

Carina of pronotum equally compressed throughout; disc flat in longitudinal section. Hind tibiae usually annulate with fuscous.

Synopsis of Species.

- A. Hind tibiae annulate with fuscous.
 B. Head and body strongly compressed; apex of wings sub-parabolic. (Fla. and Ga.) *crepitans*.
 BB. Head and body less compressed; apex of wings rounded. *bolli*.
 BBB. Head and body robust; metazona longer proportionally than in above species. (Mex.)
robustum.
 AA. Hind tibiae not annulate with fuscous. (New Mexico.)

inornatum.(See also the description of *humile*.)**Spharagemon crepitans Sauss.**

Dissosteira bollii var. *crepitans*.
 Saussure, Prod. Oed., p. 140.

1 ♀, Jacksonville, Fla.,—Priddey;
 1 ♀, Fla.,—Morrison; ♂ unknown.

Antenna.	Hind fem.	Teg.	Body.	Total.*
16	18-18.2	32-33	33-38	41-41.5 mm.

These two specimens, sent by Prof. Bruner, were referred doubtfully by him to *Tomonotus zimmermanni* Sauss. which is given as a synonym of *Chortophaga viridifasciata* by Saussure himself (Prod. Oed., p. 73).

They agree with the description of *crepitans* (l. c.) from Georgia in the greatly compressed form of the body and especially of the head, and the sub-parabolic apex of wings. It seems, however, sufficiently distinct from *bolli* to be regarded as a different species. The hind tibiae lack the bright red coloration of *bolli* but the specimens may have been in alcohol and had the color largely destroyed.

Spharagemon bolli Scudder.

Sph. bolli. Scudder, Proc. Boston soc. nat. hist., v. 17, 469.

Sph. balteatum. Scudder, Proc. Boston soc. nat. hist., v. 17, 469.

Sph. bolli Scudd. Morse, Proc. Boston soc. nat. hist., v. 26, 227.

I have nothing further to add to the synonymy as cited and stated in my previous paper (l. c.)

The great difference in size between New England and Texas specimens has already been mentioned, linear measurements of the latter being nearly forty per cent. larger. New England specimens are smaller than those of Indiana, Indiana than those of North Carolina, N. Carolina than those of Texas, and, should the specimen described here as *robustum* prove to belong to this species, we have reason to think that Mexican specimens are even larger than those of Texas. This is not improbable, specimens of *cris-tatum* from the Gulf coast of Texas being decidedly larger than those from Dallas in that State. Individuals also

* By "total" is meant the length of the insect at rest including the tegmina.

Spharagemon aequale Say.

Gryllus aequalis. Say, Journ. acad. nat. sc. Phila. ser. 1, v. 4, p. 307, — Amer. ent., ed. Leconte, v. 2, p. 237. (1825.)

Spharagemon aequale Say. Scudder, Proc. Boston soc. nat. hist., v. 17, 469; Ent. notes, iv, 68; 1 ♂ (Boll. No. 105) in collection, labeled at time of revision.

Spharagemon aequale Bruner (*in litt.*) "on Thomas' authority."

Spharagemon collare Scudd. Bruner, in Nat. mus. coll., labeled thus.

Spharagemon bolli Scudd. Bruner, in Nat. mus. coll., labeled thus.

Spharagemon wyomingianum Thos. (?) in Nat. mus. coll., labeled thus.

Oed. utahensis Thos. Thomas, in Nat. mus. coll., labeled thus.

H[adrotettix] trifasciata Say. Scudder (1 ♂, 1 ♀, Texas, Belfrage) in collection, thus labeled.

Dissosteira texensis Saussure is perhaps a synonym of this species.

While it is now impossible, owing to the destruction of the types, to identify with certainty the species described by Say, and while I regret to disturb existing nomenclature, it is yet necessary to apply Say's name to that species which the description best fits which inhabits the territory from which the types were procured. The most valuable diagnostic characters of the species of this genus are those relating to the structure of the pronotum and marking of the hind legs. This spe-

cies, better than any other, agrees with Say's statements "The thorax is not gradually raised into a carina, but the line is abrupt and of little elevation," and "Hind thighs within with four black bands." It is found in the territory traversed by Say (see Morse. — Proc. Boston soc. nat. hist., xxvi, 223) and is widespread. For these reasons, and from the fact that Harris's description of *aequale* from Massachusetts indicates the species most closely allied to this of those found there, I have applied Say's name to it.

It seems probable that *texensis* Sauss. (Prod. Oed., 135-137, 140) was applied to a Texas form of this species, but from an examination of over sixty specimens from various parts of the West, although much variation occurs in size and in height of the carina on the metazona, I have been unable to perceive any satisfactory or desirable subdivision of the species, still less an allied but distinct member of the genus.

The specimen above referred to as labeled *utahensis* by Thomas should not be regarded as the type of *utahensis* Thos. While it agrees in length of hind femora and breadth of wingband with Thomas' description it disagrees in the structure of the pronotum with both the description and figure published (U. S. Geog. Surv., Wheeler's Rep't, v., 883, pl. 44, fig. 2). As there characterized *utahensis* belongs to the *collare* series.

Aequale is closely resembled by a species of *Trimerotropis* occurring in the same territory which may be dis-

tinguished from it by having the pronotal carina cut by *two* sulci and in which the head is smaller.

42 ♂, 20 ♀, many antennae damaged, give the following measurements: Ant.: ♂, 14-14.5; ♀, 13.8-14. Hind fem.: ♂, 13.3-18.4; ♀, 16.3-18.6. Teg.: ♂, 24.6-34; ♀, 30-36. Total: ♂, 31-42; ♀, 38-45 mm.

Like *saxatile*, specimens sometimes have the metazona slightly arched in longitudinal section and the carina less compressed.

This species is often of a grayish cast of color, the disk of the wings pale in tint and with the veining at base noticeably glaucous. About one-half of the specimens seen are "collared." Specimens from Manitou and elsewhere in Colorado show the reddish suffusion mentioned in the earlier part of this paper, while those from Dallas, Texas, are vivid in tint, with strongly contrasting colors; in this form it is the handsomest member of the genus. In these the hind thighs are suffused with red internally along the median ridge. Superficially this form of the species bears some resemblance to *Hadrotettix trifasciata*, which probably accounts for the labeling mentioned above.

In distribution it is widespread. I have examined specimens as follows: Ft. Walsh, Br. Amer., Sept. (Nat. mus.); Boise City and Salmon City, Id., Aug. (Bruner and Nat. mus.); Custer, Black Hills, and Harney's Pk., Dak., 7000-8000 ft. (Nat. mus.); Yellowstone, Mont. (Nat. mus.); Ft. McKin, Wyo., Aug. (Nat. mus.);

Pueblo, July 8-Aug. 31, 4700 ft.; and Manitou, Colo., Aug. 25, 6300 ft. (Scudder); Salt Lake Vall., Utah, Aug. 1-4, 4300 ft. (Scudder); Chadron, Gordon, Ft. Robinson (Nat. mus.) and Nebraska City (Scudder) Neb.; San Antonio, — Newell, — June (Bruner), Dallas, July, — Boll, — and collected by Belfrage, June and July (Scudder and Nat. mus.). Prof. Bruner reports it also from Eastern Washington, Snake R., Id., and Barbour Co., Kansas.

Spharagemon saxatile Morse.

Spharagemon saxatile. Morse. Proc. Boston soc. nat. hist., xxvi, 229 (1894).

There is little new to be added here to the full account of this species published in my previous paper. Additional localities where I have secured it in New England are Canaan, So. Kent, and Deep River, Conn. At the latter place it is quite common. I have received it from Belmont, Mass., through Mr. C. J. Maynard, from which locality some of the specimens show a distinct pale bluish tint along the edges of the tegmina and the posterior margin of the pronotum. I have yet to see a "collared" example. It has been reported from New Jersey by Beutenmüller (Journ. N. Y. ent. soc., ii, 144; Bull. Amer. mus. nat. hist., vi, 301) occurring in situations similar to its haunts in New England.

It should be looked for, and will probably be found, on rocky hills in

vary considerably in the proportions of the eyes and head.

The species is very variable in color, partly, no doubt, in accordance with its environment, showing well the three extremes of fuscous, fulvous, and pale buff coloration; and in markings, those of the tegmina being sometimes almost entirely obsolete. The wing-band varies greatly in width; in a ♂ from Iowa in Scudder's collection it is nearly one-third the breadth of the wing, being double the width as found in many specimens.

Since my previous paper I have obtained it from the following additional New England localities: Brattleboro, Vt. (Mrs. J. B. Powers); Dedham and Belmont, Mass. (C. J. Maynard); Adams, Dover, and Martha's Vineyard Id., Mass.; Canaan, Deep River, N. Windham, and So. Kent, Conn. I have also received it from Toronto, Can. (C. Hills); Ft. Ancient, O., Williamsville, Mo. (S. W. Denton); Vigo and Marshall Co's, Ind. (Blatchley); Hot Springs, Dak. (Bruner). Bruner (in litt.) reports it from E. and N. W. Neb., Kas., Ill., Va., S. Dak., Iowa, Texas. In addition to many of these localities, Scudder's collection contains examples from Georgia, N. Car., and Colo., 6300-7000 feet. The National Museum material consists of specimens from Ind., June 29 (Bollman); Washington, D. C., and Texas. Prof. Garman reports it from eastern and Western Kentucky (Orth. of Ky., p. 9. — 6th ann. rept. Ky. agr. exp. sta.).

Spharagemon robustum sp. nov. (?)

1 ♀, Coahuila, Mex., in Scudder's collection, labeled "Spharagemon n. sp."

Antenna	Hind fem.	Teg	Body.	Total.	Proz.	Metaz.
16.5	20.6	36.5	39	46.5	3.1	6.6 mm.
Of Texas specimens of <i>bolli</i>					3	5.3

This may be only an extremely large form of *bolli*. The only specimen seen differs, in addition to its larger size and more robust form of head and body, in having the posterior process of the pronotum more produced (as shown by the measurements), distinctly acute-angled, with excavated sides and the median carina less elevated on the prozona and less compressed throughout. (See remarks under *cristatum*.)

Spharagemon inornatum sp. nov.

1 ♀, Hot Springs, N. Mex., 7000 feet alt. Received from Prof. Bruner.

Hind fem.	Teg	Body.	Total
19	29	31.5	36 mm.

Similar to *bolli* but lacks the fuscous and pale markings of the hind tibiae, which are pale reddish throughout, and the inner side of the hind femora has the two basal fuscous bands obsolete in the tibial sulcus. Two additional females in Bruner's collection have hind tibiae as above. Male unknown. The pronotal carina is scarcely as high as in *bolli* and is sharply and equally compressed throughout.

GROUP II. AEQUALE SERIES.

Pronotum carinate, carina often sinuate on prozona, otherwise as in Group III.

put, the eyes appearing more prominent in consequence; and in having the prozona proportionally shorter than in the average specimen of *aequale*. The hind tibiae are unicolorous, red;

Synopsis of Species.

	<i>Saxatile.</i>	<i>Aequale.</i>	<i>Humile.</i>
Eyes	larger, subprominent, = $\frac{1}{2}$ (σ) to $\frac{2}{3}$ (φ) the height of face from crown to clypeus	smaller, = about $\frac{2}{3}$ (σ) to $\frac{1}{3}$ (φ) said height	like <i>aequale</i>
Width of head across cheeks	= width across eyes (σ), or a little more (φ)	distinctly more than across eyes, especially in φ	like <i>aequale</i>
Crown of head in front view	flat	convex	a little convex
Width of vertex between eyes, dorsal view	= (σ), or a little more than (φ), the width of an eye	distinctly more (σ), or twice (φ), width of eye	like <i>aequale</i>
Carina	subcristate or carinate	carinate	very low, scarcely carinate
Post. process of pronotum	acute-angled (σ); slightly so or rect. (φ).	usually rectang., sometimes acute	like <i>aequale</i>

Spharagemon humile sp. nov.

2 σ , Garden of the Gods, Colo., in Scudder's collection.

Antenna.	Hind fem.	Teg.	Body.	Total.
13.5-14	13-13.3	25-26	24.6-25	31.5-33

These specimens differ from *aequale* in having the carina very low, it being scarcely more than an elevated line; in having less tumid cheeks and occi-

and the hind femora lack fuscous in the basal part of the tibial sulcus. The coloration is markedly rosaceous in tint. They are so nearly intermediate, both in coloration and pronotal structure, between the forms of series I and II with least developed carina that their correct position is open to a doubt which could be readily settled by examination of more material.

most of the eastern States, although at present known only from southern N. E., N. J., and Md.

AA. Carina only one to two-thirds as high as the width of one-half of disc of metazona. Body not or relatively little compressed.

GROUP III. COLLARE SERIES.

collare.

Carina of pronotum cristate, strongly compressed except on hind part of prozona which is joined broadly to it. Lateral carinae well-marked. Hind margin chiefly acute-angled with excavated sides.

It is impossible to give any key which will enable the novice to determine the subordinate forms treated as races of *collare* with any degree of certainty, but the following tabulated statement of the more important comparative differences will be found helpful. Additional aid may in some cases be derived from the figures and comparisons given in my paper on the New England species.

Synopsis of Species.

A. Carina of pronotum very high, about equal in height to the width of one-half of the disc of the metazona, laminate; body compressed. *cristatum.*

	<i>Head.</i>	<i>Eyes.</i>	<i>Height of carina.</i>	<i>Angulation of post. process.</i>	<i>Connection of proximal fuscous bands on inside of hind femora</i>	<i>Tegmina</i>
(<i>Larger forms</i>)						
<i>collare</i>	narrowed above; cheeks and occiput tumid	small	moderate	rectangular	not or but slightly both in amount and degree	
<i>utahense</i>	'	moderate?	high	rectangular?	?	
<i>scudderi</i>	less tumid	larger, of moderate size	high	acute	broadly, with dark fuscous or black	
<i>angustifemur</i>	sub-compressed	large	high	acute	not or but faintly	
(<i>Smaller forms</i>)						
<i>wyomingianum</i>	quadrate	large, in ♂ prominent	variable, but rather high	acute	not or but faintly	widest at costal dilatation; distinctly arcuate toward apex
<i>pallidum</i>	quadrate	moderate	moderate; low on metazona	rectangular	not or but faintly	of equal breadth throughout; very slightly arcuate toward apex

Spharagemon cristatum Scudder.

The elevation of the crest of the pronotum in this species, while the best diagnostic character with which I am acquainted, varies much individually in

Spharagemon cristatum. Scudder, Proc. Boston soc. nat. hist., xvii. 470.

its relative development on the prozona and metazona, and also the overlapping of the lobes. The anal, and sometimes also the posterior half of the discoidal, area of the tegmina is occasionally of a marked rosaceous tint. Eight specimens from the Gulf coast of Texas are noticeably larger and more bulky and have the posterior process of the pronotum more produced than those from Dallas.

Prof. Bruner has sent me a specimen from Tiger Mills, Texas, and reports it also from San Antonio, and S. W. Texas, and Barbour Co., Kansas. The National museum material consists of three examples from Dallas, and a pair from Carrizo Springs, Texas, the latter taken Aug. 28 by Dr. A. Wadgymar. Scudder's collection contains about forty specimens chiefly from Dallas, taken by Boll, a number collected by Belfrage, a single example from Dingo Bluffs, N. C., Nov. 15, and one from Tallahassee, Fla., Glover. These latter are the only examples known from the eastern States.

Spharagemon collare Scudd.

Oedipoda collaris. Scudder, Geol. Surv. Neb., 250.

Oedipoda collaris. Thomas, Syn. Acrid. N. A., 113.

Spharagemon collare. Scudder, Proc. Boston soc. nat. hist., xvii, 470.

Spharagemon collare. Morse, Proc. Boston soc. nat. hist., xxvi, 234-5.

Examination of a considerable number of specimens indicates that the forms

described as *collare*, *wyomingianum* (= *oculatum*), and *scudderi* approach each other so closely that it is at the present writing impossible to definitely limit them. Although typical specimens of these forms may be readily distinguished, others cannot be referred to any one of them with certainty: for this reason it seems best to regard them as races of one composite species. Yet it is not improbable that with more systematic collecting and observation in the territory where the forms overlap a limitation may be found possible. To this group belongs also the *Oed. utahensis* of Thomas and other western forms described here.

Race *Collare* Scudder.

Spharagemon aequale (in part). Scudder, Proc. Boston soc. nat. hist., xvii, 468.

For additional bibliography see *supra*.

This race, the typical *collare* of Scudder, is a widespread and common form in the central part of the country, and varies much in color and size. Only about one-third of the specimens seen are of the "collared" type of coloration. The hind femora sometimes have the proximal two fuscous bands slightly connected internally, but never to such an extent or depth of tint as in *scudderi*. Individuals vary much in wing-length, and in size, as the following measurements show:—

Antenna.	Hind fem.	Teg.	Total.
♂ 12	11.5-14.5	21.5-26	26.6-33
♀ 12	16 -17.6	28.5-31	36 -40

The national museum material contains specimens from Watertown, Dak., Mont., Iowa, and Ft. Robinson, Gordon, and Valentine, Neb. Prof. Bruner has sent me examples from N. and S. Dak., and reports it also from Wyo., and various parts of Neb. Scudder's collection comprises specimens from N. Ind., Crawford Co., Dallas Co., and Jefferson, Iowa, July and Aug.; North Red R., Dak., Platte R., Denver, Colo., Utah, and several specimens labeled Aspinwall but whose locality is open to some doubt.

Race *Utahense* Thomas.

Oedipoda utahensis. Thomas, U. S. Geog. Surv., Wheeler, v. 883: pl. 44, fig. 2.

Dissosteira utahensis Thos. Sausure, Addit. Prod. Oed., 167.

What the form is to which Thomas applied this name is problematical. The characterization given in the reference noted above indicates a form intermediate between *collare* and *cristatum*, and it is probable that it was applied to some form of the *collare* group. Breadth of wing-band, given by Thomas as a distinguishing character, is entirely worthless for that purpose. The only diagnostic character given that is of any importance is: "Crest of pronotum a little more elevated than in *Æ*. [*Diss.*] *carolina*." (See also *aequale*, this paper.)

Prof. Bruner has sent me a ♀ from Ogden, Utah, of a form to which he applies this name. In Mr. Scudder's collection is a series of 18 ♂, 7 ♀, from

Pueblo, Colo., Aug. 30-31, 4700 ft. alt., with which this specimen agrees save in having the carina very slightly higher. These specimens are very near the typical *collare*, though having the eyes somewhat larger, and the tegmina a little shorter than do many specimens from the plains.

Race *Scudderi* Morse.

S. aequale, subsp. *scudderi*. Morse, Proc. Boston soc. nat. hist., xxvi, 225.

S. aequale, in part Scudder, Proc. Boston soc. nat. hist., xvii, 468.

Concerning this race there is little to be added to the account given in my New England paper. I have since taken it on July 7 at Dover, Mass., two weeks earlier than before recorded. I have secured it also at North Windham and North Haven, Ct., and on Martha's Vineyard, and have received it from Belmont, Mass., through Mr. C. J. Maynard. Mr. Scudder's material consists of a single ♀ from the vicinity of Boston, several specimens from Cape Cod, and a considerable number from Nantucket Id. A badly damaged ♂, presumably of this race, from Brunswick, Me., in Scudder's collection, so strongly resembles the specimens of *collare* from Minnesota and the Red R. of the North arranged with it in the form of the head and pronotum, and as far as may be judged from what remains of the femora in lacking fuscous on their basal part, as to suggest a doubt regarding the correctness of the locality indicated.

This race rarely presents the "colored" type of coloration, though some specimens from Nantucket and a single one from Sherborn, Mass., are thus marked. It is very desirable to learn the distribution of this race outside of New England, it being unknown at present from beyond that district.

Race *Augustipenne* var. nov.

This form is very near *wyomingianum* differing in having the head larger proportionally, the tegmina and wings longer, and the pronotum slightly more constricted. The tegmina when spread are of equal width throughout and their edges are straighter toward the apex than in *wyomingianum*.

9 ♂, 4 ♀, Salt Lake Valley, Utah, 4300 ft., Aug. 1-4. Scudder's collection.

Antenna.	Hind fem.	Tegmina.	Total.
♂ 11.4-12.5	12.8-15.3	23-26	28.7-33
♀ 12.5	15 -16	27-29.5	34 -36

Race *Wyomingianum* Thos.

Oedipoda wyomingiana. Thomas, Geol. Surv. Terr., 1871, 462.

Oedipoda wyomingiana. Thomas, Syn. Acrid. N. A., 113.

Spharagemon wyomingianum. Scudder, Proc. Boston soc. nat. hist., xvii, 470.

Spharagemon aequale (in part). Scudder, Proc. Boston soc. nat. hist., xvii, 468.

Spharagemon collare. Scudder, in collection, labeled thus, from N. J. (described by Morse as *oculatum*).

Spharagemon collare. McNeill, Psyche, vi, 64. Determined from a pair in Scudder's collection, Moline, Ill., received from McNeill.

Spharagemon oculatum. Morse, Proc. Boston soc. nat. hist., xxvi, 232.

Spharagemon oculatum. Blatchley, Can. ent., 1894, 218.

The description of Thomas is misleading in some particulars and the locality of the specimens was so far removed, while the discrimination of the species has been attended with such confusion, that I described this form as new under the name of *oculatum* (l. c.) from material from Indiana and Staten Id. I have since compared what are undoubtedly the types in the National museum collection with these and find that they agree in all essential particulars. I have also received an additional series from Prof. Blatchley from Marshall Co., Ind., and in that locality at least it is a well-marked form or race. Yet specimens from Md. and N. Y. closely approach the New England form *scudderi*, and in the west even the typical *collare*. 2 ♀ from Colo. show the reddish suffusion previously mentioned.

In addition to several of the types of "oculatum" previously described, my collection contains a series of 15 ♂, 11 ♀, Marshall Co., Ind.—Blatchley; a pair from Illinois and a ♀ from Staten Id. received from Beutenmüller. Scudder's collection contains a pair from Moline, Ill.,—McNeill; 3 ♀, Chicago; and 1 ♀, Md., Sept. 14,—Uhler ("aequale"). The National

museum material consists of the following: 2 ♂, 1 ♀, labeled "*Oedipoda wyomingianum*. E. Wyo. Terr."—these are doubtless the types; 1 ♀, D. C., Sept. 7; 1 ♂, 1 ♀, Ill., Sept.; 2 ♂, Colo.; 2 ♂, 1 ♀, Valentine, Neb.; and 2 ♂, 1 ♀, Gordon, Neb. Prof. Bruner reports it from Glendive, Mont., Wyo., Colo., and W. Neb.

Race *Pallidum* var. nov.

"*Spharagemon n. sp. near balteatum*" Scudder, in collection. 4 ♂, 2 ♀, White R., Colo., July 24–Aug. 13.

Antenna	Hind fem	Teg.	Total.
♂ 11.5	12 -13.5	21-23	27 -29.5
♀ 10 -11	14.5-15.5	24-27	31.5-33.5

This form is of about the size of the typical *wyomingianum* but differs from it in having a less compressed body and head, and a less elevated carina, especially on the metazona. The eyes are smaller proportionally and less protuberant, and the hind tibiae have the basal third largely luteous. The whole insect is pallid in color. While perhaps it can scarcely be considered a distinct race it varies so much from the other forms as to make a name desirable.

COMSTOCK'S INSECT ANATOMY.

The serious study of insects in this country has already received strong support from the Professor of Entomology in the Cornell and Stanford universities, by the publication of his Introduction and his Manual, the latter of very recent appearance; and now, associating with himself Professor Kellogg, Professor Comstock has issued an Elements of Insect Anatomy, a little volume of nearly 100 pages. It is an admirable little guide, based on dissections of *Melanoplus*, *Corydalis*, *Pterostichus* and *Anosia*, but dealing more with the external anatomy than with the internal organs. Special chapters treat of the distinctively characteristic parts of insects, the organs of the mouth and the venation of the wings. In the latter, Professor Comstock modifies the position he held in his Manual and adopts more closely the views of Spuler (which Dr. Packard upheld in a recent number of *Psyche*), although he considers the costa as vein I and consequently pushes forward by one digit the numbering of all the rest. With a single exception, all the illustrations are in the chapter on venation.

We hope the little work, issued by the Comstock Publishing Co. of Ithaca, N. Y., may have a wide sale.

PROCEEDINGS OF THE CLUB.

12 April, 1895. The 187th meeting was held at 346 Marlborough St., Boston. Mr. A. G. Mayer in the chair.

Mr. F. C. Bowditch spoke of finding *Acanthocinus obsoletus* on white pine and remarked that those collected in this vicinity seem distinct. He also spoke of the habits of *Oberia bimaculata*.

Mr. A. G. Mayer discussed at some length the colors of the genus *Papilio*, especially comparing the North American and South American species. He found black very prevalent in species from temperate and boreal regions, while in tropical countries it is represented by brown.

Mr. W. L. W. Field asked if Mr. Mayer had compared specimens of *P. cresphontes* from northern localities with those from the southern states, brown being rather prevalent in those coming from Connecticut. Mr. Mayer replied this was rather a southern than a northern species.